**Cover Letter**

**Mehrdad Baratian**

**Ph.D. Candidate, Economics, Tulane University**

**Email: Mbaratian@tulane.edu**

Dear Selection Committee,

I am writing to apply to the NBER Innovation Research Boot Camp 2026. I am a Ph.D. candidate in Economics at Tulane University, and my research focuses on how shocks and policy choices reshape the direction of innovation—particularly in biomedical science—using large-scale data construction and frontier empirical methods. The boot camp is an unusually strong match for my dissertation agenda and would materially sharpen both my theoretical framing and my empirical approach to measuring innovation and its policy-relevant mechanisms.

My current dissertation project studies how the COVID-era disruption reallocated U.S. biomedical research effort across scientific domains. I build publication-level panels from PubMed and use NLP-based measurement to map papers into stable research clusters, then track how output and influence shift across fields over time. Empirically, I use transparent dynamic designs (event-study style comparisons and complementary counterfactual approaches) to distinguish shock-driven reallocation from pre-trends and secular growth, and to assess persistence. The core contribution is to quantify not only whether research activity changes, but *where it moves*—a central object in innovation economics with direct relevance for science policy and the design of crisis-response funding and institutions.

Alongside this innovation-focused work, I have ongoing research that blends policy evaluation with modern data methods. In a project on SNAP generosity and mental health, I develop a two-stage machine-learning pipeline to recover benefit intensity where it is not directly observed, then use policy variation to study downstream outcomes. This experience has

reinforced how careful measurement and credible identification must work together for results to be interpretable and useful for policy—an approach I bring to my innovation research as well.

I want to attend the boot camp for three reasons. First, it would deepen my grounding in core innovation frameworks while helping me connect high-dimensional measurement choices to interpretable economic objects. Second, it would improve how I position my work within the innovation and science-policy literatures and refine the next steps of my pipeline (including extensions on funding allocation and institutional incentives). Third, it would provide rare access to a community working at the frontier of innovation research, which is essential for turning my dissertation projects into publishable papers and a coherent long-run research agenda.

Thank you for your consideration.

Sincerely,
Mehrdad Baratian

**Recommendation letter writer:** Kevin Callison, Associate Professor, Department of Health Policy and Management, Tulane University, **Email:** **kcallison@tulane.edu**

# Mehrdad Baratian

Ph.D. Candidate
Tulane University, New Orleans

Mbaratian@tulane.edu
https://github.com/M-Baratian
www.linkedin.com/in/m-baratian


## Education

**•Tulane University** *2021 present*
*Ph.D. Candidate in* ***Econometrics and Quantitative Economics*** New Orleans, LA.
*Specializations: Applied Microeconomics, Health Economics, Innovation*

**•Tulane University** *2021-2023*
*Master in* ***Econometrics and Quantitative Economics*** New Orleans, LA.
*Specializations: Applied Microeconomics*

**•Tehran Polytechnic** *2016-2018*
*Master of Science:* ***Business Administration*** Tehran
*Graduated Top 3 in Class*

**•University of Isfahan** *2010-2015*
*Bachelor of Science:* ***Mechanical Engineering*** Isfahan
*Achieved a Top 1% Ranking in the National University Entrance Exam*

## Fields

Health Economics, Innovation, Labor Economics

## Working Experience

**Leadership Role at Tulane University:** *2022-2024*

- Vice President, Graduate Student Association—led cross-council initiatives; managed budgets; university liaison.

**Negin Bazr Co.** *2018-2021*

- Product Marketing Manager, Market Researcher.
- Developed and demonstrated advanced teamwork, decision-making, critical thinking, and problem-solving skills within the private sector, contributing to successful project outcomes and driving organizational efficiency.

**Isfahan Subsea Research and Development Center** *2021*

- Operating the Towing-Tank lab at one of the most advanced subsea research centers in West Asia.

## Technical Skills

**•Causal Inference**
*Difference-in-Differences; Regression Discontinuity; Matching; Instrumental Variables*

**•Quantitative Methods**
*Econometric Modeling; Predictive Analytics; Deep Learning; Data Analysis*

**•Natural Language Processing**
*Neural Networks; BERT models; TF–IDF; Clustering; Classification*

**•Programming**
*Python; Stata; SQL*

**•Computing**
*Amazon Web Services (AWS); Tulane University High-Performance Computing (Cypress)*

**•Languages**
*English; Farsi*

## Working Papers

**•Shocks, Reallocation, and the Direction of Innovation: The Case of COVID-19** *Job Market Paper*

– **Abstract:** Shocks reallocate attention, lab capacity, and funding across fields. I ask how major shocks reshape the field composition of research effort and whether substitution or complementarity dominates. Using COVID-19 as a global shock, I map PubMed articles (2017–2022) into 30 topical clusters with NLP and construct monthly research-effort indices. I then separate level shifts from trend breaks using interrupted time series and a stacked event-study difference-in-differences. Three patterns emerge. First, trend slowdowns: relative to pre-period growth, the median cluster's monthly growth rate falls by about seven percentage points, with many clusters registering statistically significant declines. Second, substitution toward the shock-proximate area: negatively exposed fields experience within-cluster effort drops on the order of 10–13% relative to their counterfactual pre-trends, while the COVID-19 cluster's share of total effort rises sharply at the peak. Third, complementarities: a subset of method- or platform-adjacent clusters accelerates by roughly 4–6 percentage points. These findings imply that policymakers should prioritize neglected clusters during shocks—via bridge funding and access safeguards—to mitigate unintended crowd-out, while also supporting complementary platforms that scale beneficial spillovers. Beyond COVID-19, the measurement and identification strategy provides a general framework to characterize the structure of reallocation under any major shock, guiding targeted interventions when disruptions arise

**•SNAP Generosity and Mental Health** *Working paper*

– Methods: Difference-in-Differences; dose–response Difference-in-Differences; XGBoost machine learning for data imputation
– Finding: SNAP allotments support mental health during economic hardship, with effects emerging beyond a minimum benefit threshold.

## Teaching Experiences

**•Research & Teaching Assistant, Tulane University** *2022 Present*

– Courses: Econometrics II (Ph.D. Level); Machine Learning and Econometrics; Intermediate Microeconomics; Health Economics; Introduction to Macroeconomics; Introduction to Microeconomics.

**•Teaching Assistant — Strategic Management, Tehran Polytechnic** *Spring 2018*

– Course: Strategic Management.

## Awards

- Graduate Student Summer Research Award, Tulane University *June 2024, May 2025*
- Graduate Studies Student Association Travel Award, Tulane University *May 2024*
- Joachim-Herz Foundation Award *June 2024*
- Connolly Alexander Institute for Data Science Research Grant Award *June 2024, April 2025*

## Conference And Presentation

∗ **First Author Presenter**

∗ Association for Public Policy Analysis and Management (APPAM) | Seattle, WA. *Fall 2025*

∗ Southern Economic Association (SEA)| Tampa, FL. *Fall 2025*

∗ Association for Public Policy Analysis and Management (APPAM) | Washington, D.C. *Fall 2024*

∗ Essen Economics of Mental Health Workshop, CINCH - Health Economics Research Center | Universität Duisburg-Essen. Minneapolis, MN. *August 2024*

∗ American Society of Health Economists (ASHEcon). California, San Diego | San Diego, CA. *June 2024*

## Peer Review Service

∗ **Conference Referee**

∗ Association for Public Policy Analysis and Management (APPAM) Fall Research Conference *Fall 2025*

∗ **Journal Referee**

∗ Journal of Data Analytics and Intelligent Decision-making *Fall 2025*

## References

1- Kevin Callison
Assistant Professor
Department of Public Health
Tulane University
Email: kcallison@tulane.edu
Phone: (614) 989-1764

2- Engy Ziedan
Assistant Professor
Department of Economics
Tulane University
Email: eziedan@tulane.edu
Phone: (504) 862-8343

3- Katy Bergstrom
Assistant Professor
Department of Economics
Tulane University
Email: kbergstrom@tulane.edu

## Current and Future Research

My research sits at the intersection of innovation economics, science policy, and applied econometrics. I study how major shocks and policy choices reallocate research effort across scientific domains—shaping not only the *level* of knowledge production, but also its *direction*—and how these reallocations persist or unwind over time. A defining feature of my work is measurement: I build structured datasets from large-scale administrative and text sources, and then pair them with modern causal inference and machine-learning tools to quantify changes in innovation activity in a way that is interpretable for policy.

My dissertation (job market paper) examines how the COVID-era disruption reshaped U.S. biomedical research across fields. Using PubMed publications and rich metadata, I construct a topic-level panel that tracks output and influence (e.g., publication volumes, citation trajectories, and journal placement) across a stable set of research clusters. To measure research direction at scale, I use NLP-based classification to map papers into consistent topical categories and then analyze how the distribution of effort changes around the shock. Empirically, I rely on transparent event-study designs and complementary counterfactual approaches to separate shock-driven composition changes from pre-existing trends and secular growth. The core objective is to quantify the magnitude and persistence of topic-level reallocation and to assess whether patterns are most consistent with mission-driven demand shifts, supply-side constraints, or funding-driven prioritization. This project speaks directly to foundational questions in innovation economics: how attention and resources move across technological trajectories, which frictions slow adjustment, and what policy can do to steer scientific effort toward high social value.

A second strand of my research focuses on social policy as an input to productivity and long-run opportunity. In ongoing work on SNAP generosity and mental health among low-income households, I combine policy variation with microdata and build a two-stage machine-learning pipeline to recover benefit amounts where they are not directly observed. This approach lets me study treatment intensity—not just program participation—while maintaining careful validation and calibration so the imputed measures support credible inference. Substantively, the project connects to innovation and growth through human capital and labor-market attachment: policies that stabilize consumption and reduce psychological distress can shape individuals' capacity to invest, work, and plan, with implications for aggregate productivity.

My future research agenda extends this work into a broader program on the design of science and innovation policy. I plan to study how funding rules, review incentives, and crisis-response mechanisms affect research portfolios—tradeoffs between speed and novelty, applied versus basic work, and short-run responsiveness versus long-run discovery. A central goal is to distinguish true frontier expansion from relabeling and displacement across topics, using measurement that integrates text signals with network and institutional data, and designs that map reduced-form shifts to policy-relevant mechanisms.

I want to attend the boot camp because it is the most direct way to strengthen both the intellectual framing and empirical craft that my agenda requires. The program's focus on innovation economics and innovation policy aligns tightly with my dissertation and next-step papers. I would particularly benefit from guidance on best practices for translating high-dimensional measurements into economic objects that connect cleanly to theory and to policy design. Finally, the opportunity to engage intensively with faculty and peers working at the frontier would sharpen my positioning within the innovation literature and help me develop a clearer, more ambitious pipeline of publishable projects.